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E70 Rear Seat Entertainment (RSE)

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Rear Seat Entertainment

Model: E70

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Identify the components of the Rear Seat Entertainment System used on the E70

- Describe the different functions on the RSE System on the E70

- Diagnose and service the RSE System on the E70

Introduction

Rear Seat Entertainment

"DVD system in the rear", a rear entertainment system is offered as an option in the new BMW X5 (E70).

The system consists of the following components:

- Rear seat entertainment (RSE) control unit
- 8" color monitor with folding mechanism and infrared transmitter
- Headphone connection
- Remote control.

The "DVD system in the rear"option offers the following functions:

- Playback of photos, audio or video
- Connection to external equipment
- Headphone connection.

E70 Rear Seat Entertainment

The rear seat entertainment system provides the following functions:

- Playback of
    - Video CD or DVD on the fold-out monitor
    - Audio CD or audio DVD
    - Compressed audio files
    - Photo CD or DVD
- Audio playback via
    - Audio speaker
    - Headphones
- Connection to external equipment, like video camera, games consoles or portable playback equipment.
- Operation via remote control

The rear seat entertainment is functionally independent of the other entertainment sources available in the vehicle. Via the iDrive, the driver or front passenger can release or lock the rear seat entertainment in the "Settings" menu. The rear seat entertainment program cannot be controlled by iDrive.

Rear Seat Entertainment Locked Out

Index	Explanation
1	Release rear menu

Rear Seat Entertainment Activation in iDrive

Index	Explanation	Index	Explanation
1	Settings	3	Release rear menu
2	Release sound settings		

Once the rear seat entertainment system is activated, the rear-seat passengers can be entertained by the rear display and headphones or audio speakers in the vehicle. If head-phones are used, a different medium can be enjoyed via the rear seat entertainment sys-tem, independently from the vehicle audio system. The rear seat entertainment display or headphones can be controlled by a remote control. The settings made are displayed in the rear display. No visual status signal display is issued for volume navigation.

System Overview

The input/output and the E70 rear seat entertainment system circuit diagram are shown on the following pages. The rear seat entertainment (RSE) control unit and the rear display are integrated in the K-CAN.

The rear seat entertainment is controlled by a remote control. The signal path is the same as the one for the remote control services. Audio playback via the audio loudspeakers in the vehicle or headphones. The RSE control unit and the rear display are integrated in the K-CAN. External audio and video sources can be connected via the AV input on the RSE control unit.

- Video and audio in the rear
- Fold-out monitor
- Headphone connection
- Remote control
- Connection to external equipment

Rear Seat Entertainment System Diagram
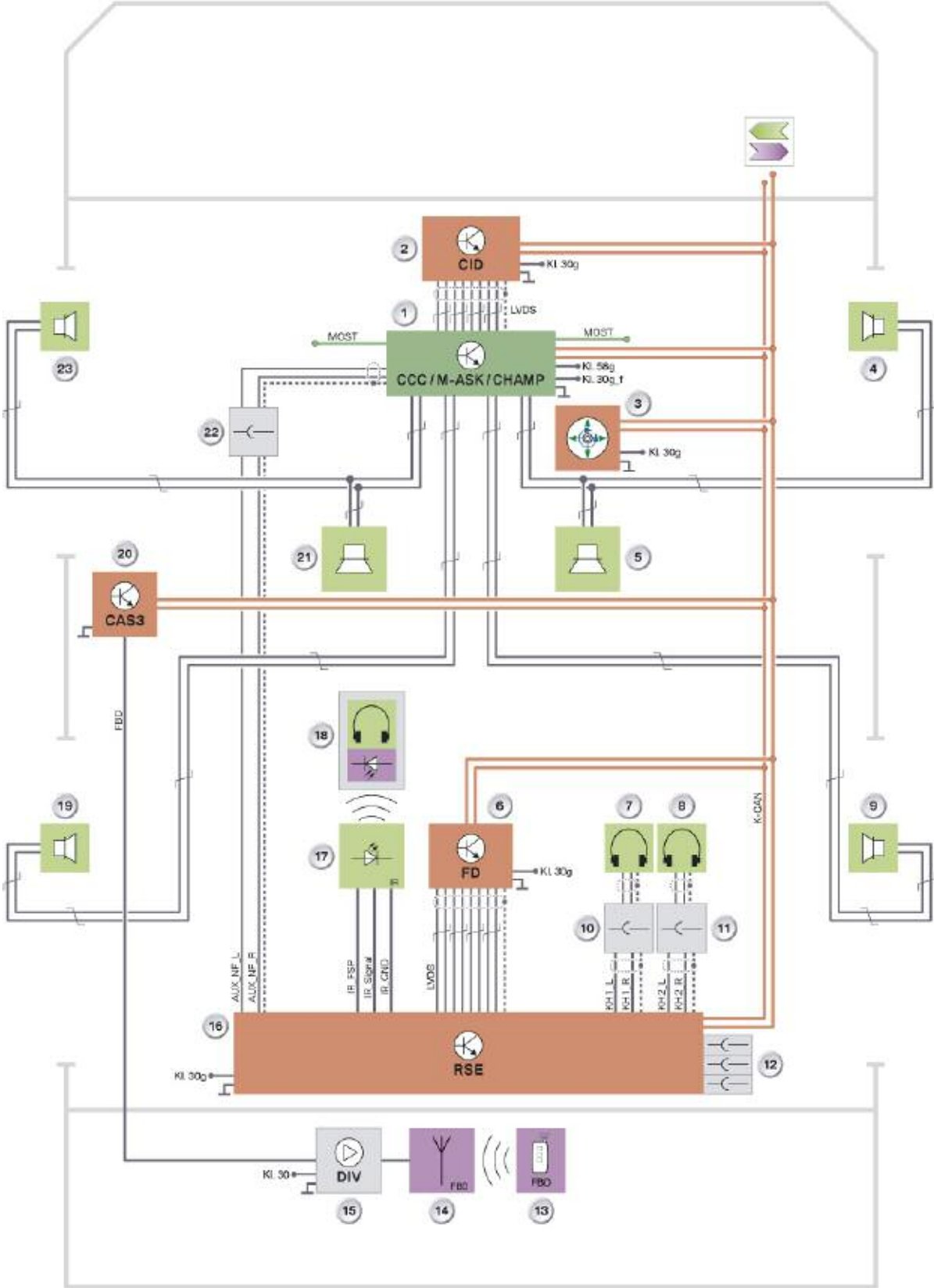
Rear Seat Entertainment System Diagram Legend

Index	Explanation	Index	Explanation
1	Headset	13	Remote control
2	Central information display	14	Remote control services aerial
3	Controller	15	Aerial amplifier with diversity module
4	Broadband speaker right-hand front door	16	Rear seat entertainment
5	Central bass speaker, right	17	Infrared transmitter
6	Rear seat area display	18	Infrared headphones
7	Wired headphones, left	19	Broadband speaker left-hand rear door
8	Wired headphones, right	20	Car Access System 3
9	Broadband speaker right-hand rear door	21	Central bass speaker, left
10	Headphone socket, right	22	Audio jack
11	Headphone socket, left	23	Broadband speaker left-hand front door
12	AV input (external equipment)		
AUX_NF_L	Audio input for additional audio sources, left-hand channel	AUX_NF_R	Audio input for additional audio sources, righthand channel
FBD	Remote control services	IR_FSP	Power supply infrared transmitter
IR_GND	Infrared transmitter, ground	IR_SIGNAL	Infrared transmitter signal
KH1_L	Left-hand headphones, left hand channel-	KH1_R	Left-hand headphones, right hand channel
KH2_L	Right-hand headphones, left-hand channel	KH2_R	Right-hand headphones, right-hand channel
LVDS_	Low voltage differential signal (digital RGB signal)	MOST	Media Orientated System Transport (digital bus)

K-CAN signals on the RSE control unit

In/out	Signal	Source/sink	Function
In	Control signals	> FBD aerial > CAS3	RSE control (entertainment source, track selection, etc.)
In	Date, time	>Instrument cluster	Indicator in the rear display
In	RSE release	> Controller > Headset	Rear seat entertainment release
In	Terminal status	> START/STOP button > CAS3	Activation conditions
Out	RSE status	> Headset	Current release status
Out	Control signals	> Rear display > Indicator	ON/OFF, setting

K-CAN signals on the RD control unit

In/out	Signal	Source/sink	Function
In	RSE status	> RSE	RSE operational
Out	RD status	> RSE	Rear display operational

Note: The HiFi and CHAMP systems are standard equipment on US vehicles.The rear seat entertainment is available in conjunction with the HiFi system and the Top-HiFi system.

The commands entered using the remote control of the rear seat entertainment are transferred via the transmission frequency, which is also used for the radio remote control key function.

The frequency used is dependent on the national variant and therefore relevant for coding. and therefore relevant for coding.

The commands are received by the FBD aerial and routed via the antenna amplifier with diversity module to the CAS3. The CAS3 converts the signals into K-CAN messages. The commands then reach the RSE control unit via the K-CAN.

If audio is played back via the audio speakers in the vehicle, the audio signal is routed from the RSE control unit via the AUX_NF cables and via the audio socket to the radio or navigation system Aux_In. The audio socket is standard equipment in the E70 and fitted under the center armrest. The connection to the RSE control unit is disconnected manually by connection of an external item of equipment to the audio socket.

Other external items of equipment can be connected via the AV input to the RSE control unit.

The programming, coding and diagnostics for the rear seat entertainment are performed via the K-CAN. The terminal status is also transferred as a K-CAN message.

System Components

Rear seat entertainment consists of the following components:

- Rear Seat Entertainment (RSE) control unit with DVD drive, buttons and audio/video (AV) input for external equipment

- Rear display with infrared transmitter

- Headphone connection for infrared and wired headphones

- Remote control.

Index	Explanation	Index	Explanation
1	Rear seat area display	3	Headphone sockets
2	Rear seat entertainment control unit	4	Power supply for external equipment

Rear Seat Entertainment System Components

Rear Seat Entertainment System Components Legend

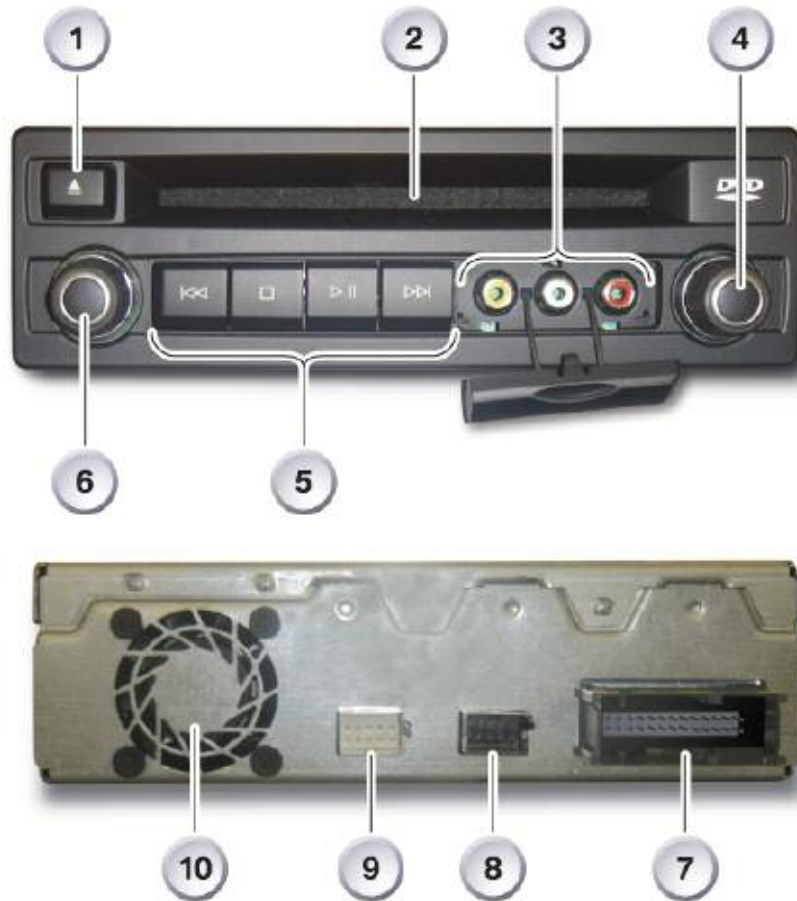| Index	Explanation	Index	Explanation
1	Car Communication Computer (CCC)	8	Connection to external equipment
2	Multifunction steering wheel (MFL)	9	Wired headphones(no equipment specification)
3	Central information display (CID)	10	Headphone sockets for wired headphones
4	Wheel speed sensor	11	Infrared headphones (no equipment specification)
6	Controller	13	Rear seat area display
7	Remote control	14	RSE control unit

The E70 rear seat entertainment comes with the 'Professional' radio. and CHAMP is fitted as the "Professional"' radio option on US vehicles.

Note: Audio is played back either through the audio speakers in the vehicle or via the headphones. The road speed dependent volume control will only affect the audio playback through the speakers and not the headphones

The wheel speed signals are routed from the DSC control unit to the PT-CAN and converted in the Junction-box ECU (JB) to the K-CAN protocol. The instrument cluster processes the road-speed signal and makes it available on the K-CAN.

The volume of the speakers can be set using the buttons on the steering wheel or the headset. If audio is played back via the headphones, the volume can be adjusted either on the headphones (infrared headphones) or using the remote control (wired headphones).

RSE Control Unit

Index	Explanation	Index	Explanation
1	DVD drive eject button	6	Rotary/push controller, left
2	DVD drive slot	7	Power supply, K-CAN
3	Connection for external equipment (yellow: video, white: audio signal, left, red: audio signal, right)	8	Rear display connection
4	Rotary/push controller, right	9	not used
5	Buttons	10	Fan

RSE Control Unit Tasks

The RSE control unit has the following tasks:

- Playback of audio and video media

- Operation of media playback on the RSE control unit

- Connection of rear display via LVDS (Low Voltage Differential Signal)

- Audio playback via

  – Infrared headphones

  – Wired headphones

  – Audio loudspeakers in the vehicle

- Connection of external equipment via AV input

- K-CAN interface.

The rotary/push controller switches the rear seat entertainment on/off and sets the playback volume of the wired headphones.

The playback volume of the audio loudspeakers in the vehicle and the infrared headphones cannot be controlled by the rotary/push controller

The RSE control unit can be switched on at "terminal R ON". With "terminal R OFF", the RSE control unit can be switched on within the run-on time of 30 minutes (terminal 30g active). If the control unit is switched on and is not switched off by the rotary/push controller, then it remains active until the energy management system detects the starting capability limit.

Media Supported

The RSE Control Unit Supports the Following Media:

- Video DVD

- Video CD

- Super Video CD

- Audio CD

- DVD or CD with the following compressed data formats.

Compressed Data Supported

The following compressed data formats are supported:

- Video
  - MPEG-1 video
  - MPEG-2 video
  - MPEG-4 video
- Audio
  - MPEG-1 layer 2 audio
  - MPEG-1 layer 3 audio (MP3) with ID3 tags
  - MPEG-2 layer 2 audio
  - Windows Media Audio (WMA) with WMA tags
  - Advanced Audio Coding (AAC)
  - Ogg Vorbis (OGG)
- Pictures
  - JPEG

Note: The DVD audio format is not supported by the RSE control unit. However, if the DVD contains a video track, this is usually played.

Rear Digital Display

Index	Explanation	Index	Explanation
1	LVDS connector	5	8" display module
2	K-CAN connector and supply	6	Photodiode
3	Audio signal connector Infrared transmitter	7	Infrared transmitter
4	Microswitch in the swivel joint	8	Panel made of Makrolon

The Rear Digital Display Features
- Resolution of 800 x 480 pixels

- Brightness of 500 Cd/qm

- Switch off by turning

- Switch on by folding out and turning

- Plugs for K-CAN, LVDS, infrared transmitter.

The rear display is switched on by folding it up and turning it counterclockwise into pos tion. The RSE control unit is switched on when the rear display is switched on. Turning the rear display actuates a microswitch located in the swivel joint. The rear display is switched off by turning it clockwise or by switching the RSE control unit off. Folding down the rear display does not switch off the RSE control unit, because the CD audio function must be maintained.

The rear display photodiode aids brightness control.

Infrared Transmitter

The infrared transmitter consists of seven infrared diode and is located in the base of the rear display behind a Makrolon panel. The infrared transmitter is supplied with power from the RSE control unit. The infrared diode therefore light up for as long as the RSE control unit can be activated or is active. The infrared diode go out when the RSE control unit is OFF and the run-on time of 30 minutes after terminal R has switched off..

To insure perfect function of the infrared headphones, note the following:

- Eye contact between the receiver on the headphones and the infrared transmitter

- Makrolon panel on the infrared transmitter is clean and free from scratches.

Remote Control

The function LED lights up after actuation of each button to check the transmission function. This confirms sending of a radio signal. The remote control signals are only converted if the rear seat entertainment is activated.

The thumbwheel, the confirmation button and the cross-control key represent the controller functions. Turning the thumbwheel corresponds to turning the controller. Sliding the controller to the left, right, forwards or back is replaced by pressing the corresponding button on the cross-control key. Pressing the controller corresponds to pressing the confirmation button. The remote control only controls the rear seat entertainment.

By pressing the start menu button, the rear seat entertainment start menu is displayed in the rear display. For further information on operation of the rear seat entertainment, please refer to the Owner's Handbook.

Remote Control

Index	Explanation	Index	Explanation
1	Function LED	5	Selection of wired headphones left/right
2	Thumbwheel	6	Station/track search
3	Confirmation button	7	Wired headphones volume
4	Cross-control key (four buttons)	8	Start menu

The headphones selection switch (5) determines whether the remote control controls the left-hand or right-hand wired headphones. All audio settings made with the remote control relate only to the wired headphones.

The range of the remote control is restricted to the vehicle interior. Depending on the country, the remote control is available for the following frequencies:

- 868 MHz
- 434 MHz
- 315 MHz
- 315 MHz low power.

Headphones

Two infrared headphones are included with the RSE option. Wireless headphones can be purchased separately.

Infrared Headphones
Only approved BMW accessory/replacement IR headphones should be used on the E70. These can be ordered from the EPC. Volume control for the IR headphones is on the headset itself.

The carrier frequencies of the infrared headphones are:

- Left channel: 2.3 MHz

- Right channel: 2.8 MHz.

There is no restriction regarding the maximum number of infrared headphones that can be used.

Wired Headphones
The connection sockets have a diameter of 3.5 mm. All commercially-available wired headphones with an impedance of at least 8 Ω can be connected. Volume control for wired headphones is achieved via remote control or on knobs located on the RSE panel. Left and right volume controls for wired headphones are independently controlled.

Service Information

Diagnosis

The BMW diagnostic system contains the diagnostics for the rear seat entertainment under "Rear Seat Entertainment". Test plans and control unit functions for the following

components are available:

- RSE power supply
- Rear seat entertainment control unit
- Headphones
- Remote control
- RD power supply.

The RSE control unit and RD rear display are the control units available.

Teaching-in the remote control

There is a test plan for teaching-in the remote control in the diagnostics under Rear Seat Entertainment.

The test plan works through the following steps:

- The entry of the current detected remote control for the rear seat entertainment is deleted in CAS3.
- The remote control for the rear seat entertainment is taught in.
- Successful teaching-in of the remote control is acknowledged by the automatic closing and opening of the central locking.

Note: Remote controls are not interchangeable. Only the taught-in remote control is functional in the vehicle.

Programming and Coding

The RSE control unit can be programmed and coded. The DVD area code can be changed during coding only if mileage is below 60 miles on the odometer.

DVD Area Code

DVD area codes were introduced to restrict playback of DVDs to particular markets. As a rule, DVDs appear in one region before they do in another region. The earth has been divided into different regions and an area code has been assigned to each region:

Area code	Region
Region 1	Canada, USA and US territories
Region 2	Europe, Japan, Middle East, Egypt, South Africa, Greenland
Region 3	South-east Asia including Hong Kong and South Korea
Region 4	Australia, New Zealand, the Caribbean, Central and South America, Pacific Islands
Region 5	Former CIS states, Indian subcontinent, Mongolia, North Korea, Africa (excluding Egypt and South Africa)
Region 6	China

So that the area code functions, each DVD player is equipped with its own area code, determining for which market the device is intended. European devices are preset with area code 2, whereas American devices have area code 1. Each DVD can have one or more area codes, depending on the region(s) for which it is intended. Area code 0 identifies DVDs that are released for all regions. It is also possible that DVDs are released for particular regions, like 2, 3, 4, 5 and 6 - all countries excluding the USA.

When inserting a DVD, the RSE control unit checks whether the region defined in the control unit matches the DVD country code. In this way, you can control which country the DVD can be played in. The RSE control unit permits a maximum of five area code changes, then the area code of the DVD most recently inserted is stored in the RSE control unit. As a result, only DVDs with the area code defined in the RSE control unit can then be played.

The number of changes still possible and the area code currently set can be issued in the BMW diagnostic system under RSE control unit functions.

The area codes are set by coding the RSE control unit. Changing the area code in the control unit by coding reduces the number of possible area code changes. If changes are no longer possible, the control unit must be replaced when a DVD with a different area code is to be played.